wherein the layer-shaped heating conductor is arranged in a layer plane of the layer structure to obtain an at least approximately homogeneous distribution of the heating power over a cross-section of the layer structure[, the layer plane being disposed between the function layer and the cover layer].

3. (Twice Amended) The planar sensor element according to claim 1, wherein the planar sensor element is formed using a sintering process,

wherein, before the layer structure is sintered, the [function] functioning layer includes at least two function layer-side foils and the [cover] non-functioning covering layer includes at least one cover foil-side foil, the cover foil-side foil having a predetermined thickness, and

wherein a total thickness of the at least two function layer-side foils is at least approximately equal to the predetermined thickness.

REMARKS

Claims 1 - 7 remain pending in the present application. In view of the above amendments and the following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

Claims 1 - 7 stand rejected under 35 U.S.C. § 112, second paragraph as indefinite for failing to particularly point out and distinctly claim the subject matter of the invention.

Regarding claim 1, the Examiner will note that the language "the layer plane being disposed between the function layer and the cover layer" has been deleted. In addition, the Examiner will note that claim 1 now refers to a non-functioning covering layer to more clearly refer to the cover foil 32 rather than the cover layer 26.

Regarding claim 3, the Examiner will note that claim 3 has been amended herein to recite that the planar sensor element is formed using a sintering process. This limitation is fully supported by the Specification. See, for example, page 3, line 28 - page 4, line 3 of the Specification.

In view of the foregoing, it is respectfully submitted that the claims fully

comply with the requirements of 35 U.S.C. § 112, second paragraph and that this rejection should be withdrawn.

Claims 1 - 5 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 4,505,806 ("Yamada '806") or U.S. Patent No. 4,505,807 ("Yamada '807"). Applicants respectfully submit that neither Yamada '806 nor Yamada '807 anticipate the present claims as amended herein for the following reasons.

Claim 1 relates to a planar sensor element for determining at least one gas component. The sensor element includes a layer structure. Claim 1 has been amended herein to recite that the layer structure includes a functioning layer and a non-functioning covering layer. The layer structure further includes a heating element disposed between the functioning layer and the non-functioning layer. As indicated in the Amendment filed on May 22, 2000, the sensor element according to the present claims has several advantages, including improved resistance to temperature variations and thermal shock and enhanced efficiency of the heating element. See, for example, page 2, lines 1 - 3 of the Specification.

Yamada '806 describes two embodiments of an oxygen sensor. In the second embodiment, two intermediate board members 7b are disposed between two board members 7a. Each of the intermediate board members includes a heat generating resistor 16a. One of the outer two board members 7a defines an oxygen pump element, and the other of the outer two board members 7a defines an oxygen concentration cell element. Clearly, each of these board members defines a functioning member. That is, neither of these board members defines a non-functioning covering layer as recited in claim 1. Therefore, because Yamada '806 fails to describe each and every element as set forth in claim 1 as amended herein, such claim is not anticipated thereby. Verdegaal Bros. v. Union Oil Co. of Calif., 814 F.2d 628, 631 (Fed. Cir. 1987).

Similarly, Yamada '807 describes an oxygen sensor, which includes an oxygen concentration cell element 1, an oxygen pump element 2 and a heater element disposed therebetween. Neither the oxygen concentration cell element 1 nor the oxygen pump element 2 defines a non-functioning covering layer as recited in claim 1 as amended herein. Accordingly, Yamada '807 fails to anticipate claim 1

as amended herein. Id.

As for claims 2 - 5, all of which ultimately depend from claim 1, it is respectfully submitted that these claims are patentable for at least the same reasons given in support of the patentability of claim 1.

Claims 1 - 7 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 5,529,677 ("Schneider et al.") in view of Yamada '806 or Yamada '807.

Schneider et al. describe a planar polarographic sensor for determining the lambda value of gas mixtures. It is the Examiner's position that Schneider et al. describe a heater 27 between a cover layer 29 and a function layer 14 and/or 22. In the cross-sectional views of Figures 3 and 5, the heater 27 is clearly shown to be arranged so that a homogeneous distribution of heat would not be achieved over the cross-section of the sensor. In either of Figures 3 and 5, the heater 27 is significantly offset from the center of the sensor. In order to locate the heater 27 at the center of the sensor to achieve a homogeneous distribution of heat, the thickness of thin solid electrolyte sheet 29 would have to be at least doubled in the case of the embodiment shown in Figure 3 or at least tripled in the case of the embodiment shown in Figure 5. Schneider et al. does not in any way teach or suggest locating the heater 27 so that a homogeneous distribution of heat is achieved. The Examiner's position that locating the heater 27 in the center of the sensor would minimize temperature gradients and thermal stress throughout the sensor is without merit and contrary to the principles of thermodynamics. An increase of the thickness of sheet 29 would only increase the temperature gradient in the sheet 29, not minimize the temperature gradient. An increase of the thickness of sheet 29 would only increase thermal stress on the sensor, not decrease such thermal stress.

Obviousness of a claimed invention can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. In re Fine, 837 F.2d 1071 (Fed. Cir. 1988). That certain references can be

combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680 (Fed. Cir. 1990). Contrary to the Examiner's position, none of the cited reference provide the required teaching, suggestion or motivation to combine the references as proposed. As indicated above, Schneider et al. teaches away from making the proposed combination. In addition, to centrally locate the heater 27, as purportedly taught by Yamada '806 or Yamada '807, would locate the heater 27 in the electrolyte sheet 22 in the embodiment shown in Figure 3 or at the location of electrode 42 in the embodiment shown in Figure 5. This modification would render the sensor taught by Schneider et al. unsatisfactory for its intended purpose, thereby negating any suggestion or motivation to make the proposed modification, In re Gordon, 733 F.2d 900 (Fed. Cir. 1984), or otherwise change the principle of operation of the sensor taught by Schneider et al., thereby rendering the teachings of the cited references insufficient to render the present claims obvious, In re Ratti, 270 F.2d 810 (C.C.P.A. 1959). For at least the foregoing reasons, the cited references cannot support the obviousness rejection, and withdrawal of the same is respectfully requested.

As for claims 2 - 7, all of which ultimately depend from claim 1, it is respectfully submitted that these claims are patentable for at least the same reasons given in support of the patentability of claim 1. In re Fine, 837 F.2d 1071 (Fed. Cir. 1988).

It is therefore respectfully submitted that all of the presently pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

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Respectfully submitted,

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